REMARKS

Allowable claims 3, 4, 5, 11 and 12 have been rewritten in independent form. The only independent claims are now allowable claims 3, 4, 5, 11 and 12, with the other claims depending directly or indirectly therefrom.

In view of the present amendments limiting all claims to allowable subject matter, it is believed that the prior art rejections set forth in paragraphs 5-19 of the office action are now moot.

The rejection of claims 1-19 for indefiniteness is respectfully traversed. The rejection is based on an erroneous premise, i.e. that "these measurement methods would not be known to one of ordinary skill in the art and one of ordinary skill would not be able to make and or use the device based on applicant's present disclosure ...," quoting from paragraph 4 of the office. Actually, the contrary is true. "JIS" is an acronym for **Japanese Industrial Standards**, which, as the name implies, are industry-wide standards, used throughout Japan and beyond. Attached hereto is a copy of the Japanese Industrial Standard (JIS K 7361-1) (Attachment A), referred to in the claims, and an English translation thereof (Attachment B). In the "Foreward" it states that it was published January 20, 1997. In the introduction of K 7361-1, it is explained that this standard has been prepared on the basis of ISO 13468-1, "Plastics - Determination of the tot al luminous transmittance of transparent materials – Part I: Single beam instrument" published in 1996. Also see the excerpt from *Wikipedia* (Attachment C). A search of the USPTO database for patents with claims reciting JIS standards resulted in 1975 patents issued since 1975 as "hits" (Attachment D). These attachments should establish to the Examiner's satisfaction that the JIS are definite standards that would have been known to those skilled in the art prior to applicants' invention.

It is respectfully that the captioned application is now in condition for allowance.

Respectfully submitted,
Bacon & Thomas

Date: June 20, 2008

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A

プラスチック— 透明材料のヘーズの求め方

K 7136 : 2000

(ISO 14782 : 1999)

Plastics—Determination of haze for transparent materials

序文 この規格は，1999年に第1版として発行された**ISO 14782**，Plastics—Determination of haze for transparent materialsを翻訳し，技術的内容及び規格票の様式を変更することなく作成した日本工業規格である。

1. 適用範囲 この規格は，透明で基本的には無色のプラスチックについて，光線の広角散乱に関する特定の光学的性質であるヘーズの求め方について規定する。この試験方法は，この方法によって測定したヘーズ値40 %以下の材料に適用できる。

参考 つや消しの透明プラスチックも測定できるが，狭い角度での光散乱のために異常に低い値を得る場合がある。

2. 引用規格 次に掲げる規格は，この規格に引用されることによって，この規格の規定の一部を構成する。これらの引用規格のうちで，発効年（又は発行年）を付記してあるものは，記載の年の版だけがこの規格の規定を構成するものであって，その後の改正版・追補には適用しない。発行年を付記していない引用規格は，その最新版（追補を含む。）を適用する。

JIS K 7361-1 : 1997 プラスチック—透明材料の全光線透過率の試験方法—第1部：シングルビーム法

備考 **ISO 13468-1** : 1996 Determination of the total luminous transmittance of transmittance materials —Part 1 : Single beam instrumentが，この規格と一致している。

ISO 291 : 1997 Plastics—Standard atmospheres for conditioning and testing

ISO 5725-1 : 1994 Accuracy (truness and precision) of measurement methods and results—Part 1 : General principles and definitions

ISO 5725-2 : 1994 Accuracy (truness and precision) of measurement methods and results—Part 2 : A basic method for the determination of repeatability and reproducibility of a standard measurement method

ISO 5725-3 : 1994 Accuracy (truness and precision) of measurement methods and results—Part 3 : Intermediate measures on the precision of a test method

ISO 7724-2 (1) Paints and varnishes—Colorimetry—Part 2 : Colour measurement

ISO/CIE 10526 : 1999 CIE standard illuminants for colorimetry

ISO/CIE 10527 : 1991 CIE standard colorimetric observers

IEC 60050-845 : 1987 International electrotechnical vocabulary—Chapter 845 : lighting

注(1) 近く発行予定 (**ISO 7724-2** : 1984の改正)

(2) 近く発行予定 (**ISO/CIE 10526** : 1991の改正)

3. 定義 この規格で用いる用語の定義は，**JIS K 7361-1**の**3.**によるほか，次による。

3.1 ヘーズ (haze) 試験片を通過する透過光のうち，前方散乱によつて，入射光から0.044 rad (2.5°) 以上それた透過光の百分率。

4. 原理 **3.**で定義するヘーズを，積分球の効率が一定になるように補償した積分球を用いて測定する (**5.6の備考**参照)。

5. 装置

5.1 装置は，安定した光源，接続光学系，開口部を備えた積分球及び測光器から構成し，測光器は，受光器，信号処理装置及び表示装置又は記録計から構成される (付図1参照)。

5.2 使用する光源及び測光器は，フィルターを通ってその組合せの特性が，**ISO/CIE 10527**による等色関数$\bar{y}(\lambda)$と等しい明所視標準視感効率$V(\lambda)$ (**IEC 60050-845**で定義) と，**ISO/CIE 10526**に規定するCIE標準の光D_{65}の組合せに相当する出力を与えるものでなければならない。測光器の出力は，使用する光束の範囲で，入射光束に1 %以内で比例しなければならない。

光源及び測光器の分光特性並びに測光特性は，測定の間は一定に保たれることが望ましい。

5.3 光源は，光学系と組み合わされて平行な光束を作るものとする。この光束に含まれるどの光線も光軸との間の最大角が0.05 rad (3°) を超えてはならない。この光束は，積分球のどちらの開口部においても不鮮明であってはならない。

5.4 装置は，光束がない場合に読取り値が一定になるように設計されている必要がある。

5.5 透過光束を集めるには，積分球を用いる。積分球の直径は，全開口部の面積が積分球の内面積の3.0 %を超えない限りどのような値でもよい。

積分球の直径は，大きな試料を測定できるように150 mm以上であることが望ましい。

5.6 積分球には，入口開口，出口開口，補償開口及び受光開口がある（付図1参照）。入口及び出口開口の中心は，球の同一大円上にあって，それらの開口の中心間に対応する大円上の円弧の中心角は，3.14 rad±0.03 rad (180°±2°) とする。

出口開口の直径が，入口開口の中心に対して作る角度は，0.140 rad±0.002 rad (8°±0.1°) とする。

出口開口及び補償開口は，同じ大きさとする。入口開口，補償開口及び受光開口は，積分球の同一大円上にあってはならない。補償開口は，入口開口との中心角が1.57 rad (90°) 以内となる位置に設ける。

備考 補償開口は，積分球の効率が，球の内表面積，開口の数及びそれらに何が置かれるかによって変わるので，それを補償するのに用いる。

5.7 入口開口に試料を置いていない場合，出口開口での光束の断面は，ほぼ円形で明りょう(瞭)であり，出口開口と同心円で，出口開口のまわりに環状部が残らなければならない。その環状部が入口開口の中心に対して作る角度は0.023 rad±0.002 rad (1.3°±0.1°) になる。

備考1. 特に，光源側の開き角及び焦点距離が変わった場合には，遮られていない入射光束の出口開口における直径が**5.7**に規定されたもので，中心が一致していることを確かめることが重要である。

2. 環状部の許容差±0.002 rad (0.1°) は，ヘーズの読み値では±0.6 %の不確かさに相当する。これは，この試験方法の精度の評価に関係する。

5.8 積分球には，遮光板を取り付けて，試料を通過した光を受光器が直接検出しないようにする。

受光器は，積分球上で入口開口から1.57 rad±0.26 rad (90°±15°) の中心角をなすものとする。出口開口及び補償開口に置く光トラップは，試料がないときに光を完全に吸収するものであるか又は，装置が出口開口及び補償開口に光トラップを必要としないように設計されていなければならない。

5.9 **ISO 7724-2**によって求めた，積分球の内面，遮光板及び参照白板（通常，これは装置製作者から供給される。）の三刺激値のY_{10}は90 %以上及びその変動は±3 %の範囲に入っていなければならない。

積分球内面の反射率を直接測定することが難しい場合には，内面と同じ材料及び条件で別に作成した面を測定してもよい。

5.10 試験片ホルダーは，試験片を光束に±2°以内で直角に固定し，拡散光を含む全透過光を捕足できるように，試験片をできる限り積分球の近くに取り付けられるものとする。また，ホルダーは，柔軟性のある試験片を平たんに保持できるものとする。

薄くて柔軟性のあるフィルムは，その端を二重のリング状ホルダーに挟むか，両面接着テープを用いてホルダーの端に取り付けるのがよい。後者の方法は，二重のリング状ホルダーに取り付けできない厚い試験片にも用いられる。真空ポンプや真空吸着板を用いて，試験片を試料台に取り付けてもよい。

6. 試験片

6.1 試験片は，フィルム，シート又は射出成形や圧縮成形による成型品から切り出す。

6.2 試験片は，欠陥，ほこり，グリース，保護材料からの接着剤，かき傷，ごみなどがなく，目で見えるような空げきや異物があってはならない。

6.3 試験片は，積分球の入口開口及び補償開口を覆うのに十分な大きさとする。直径50 mmの円板又は一辺50 mmの正方形のものがよい。

6.4 試験片は，特に規定がない場合には，試験材料の各試料ごとに3個作製する。

7. 状態調節

7.1 必要に応じて，試験片は，試験の前に，**ISO 291**によって温度 (23±2)℃，相対湿度 (50±10)%の条件で40時間以上状態調節する。

7.2 必要に応じて，試験装置は，温度 (23±2)℃，相対湿度 (50±10)%に保った雰囲気に設置する。

8. 手順

8.1 試験装置は，試験前に十分に時間をおき，熱平衡に到達させる。

8.2 試験片ホルダーに試験片を取り付ける。

8.3 表1に示す4個の値（τ_1，τ_2，τ_3及びτ_4）を計器から読み取る。

8.4 試験片の厚さを3か所で測定し，シートの場合0.02 mm，フィルムの場合は1 μmまで正確に測定する。

8.5 3個の試験片について前述の手順を順次行う。

9. 計算

ヘーズ (%) は，次の式によって算出する。

$$\text{ヘーズ}=[(\tau_4/\tau_2)-\tau_3(\tau_2/\tau_1)]\times 100$$

ここに，τ_1：入射光の光束

τ_2：試験片を透過した全光束

τ_3：装置で拡散した光束

τ_4：装置及び試験片で拡散した光束

参考　ヘーズは，全光線透過率τ_tに対する拡散透過率τ_dの比として定義される。

シングルビーム装置を用いて正確に全光線透過率を求めるためには，(**ISO 13468-1**に規定しているように) 補償開口には光トラップの代わりに試験片を置く必要がある。これは積分球の効率が変化するのを打ち消すためである。もう一つの方法として，ダブルビーム装置で校正した標準試験片を用いて，測定値を補正して求めることができる。しかし，得られるヘーズ値に差はほとんどないので，補正開口には試験片の代わりに光トラップを置いて得られるτ_1を用いれば実用上十分である。

また，正確な拡散透過率τ_dは，前記の方法で得たτ_1を用いて，$[(\tau_4)-\tau_3(\tau_2/\tau_1)]/\tau_1$から求めることができる。

10. 精度　試験データの精度を求めるために，試験室間で共同試験を行った。8種類の試料を7試験機関で測定した。データは，**ISO 5725-1**，**ISO 5725-2**及び**ISO 5725-3**を用いて解析した。結果を**表2**に示す。

異常値は，Grubbsの方法で検出し除外した。

ヘーズ値が1 %以下の場合には，測定の精度は，測光器の精度で限定されることが分かる。

しかし，この測定方法によれば，40 %までのヘーズを相当によい精度で測定できる。

備考　補償開口がある装置とない装置で測定値の差を比較するために，最初に予備的な共同試験を行った。8試験機関が参加して，0.2 %〜35.3 %までのヘーズ値をもつ12種類の試験片を用いた。

結果は，補償開口のない装置で測定したヘーズ値は，補償開口のある装置による測定値よりも，平均値で8.9 %低かった。変動係数，すなわち，ヘーズ値で除した室間標準偏差は，すべての試料についてほとんど同じであった。

しかし，補償開口のない装置で求めた変動係数，すなわち，ヘーズ値で除した室間標準偏差は，補償

表1　測定方法

	入口開口	出口開口	補償開口
τ_1		参照白板	光トラップ*
τ_2	試験片	参照白板	光トラップ
τ_3		光トラップ	参照白板
τ_4	試験片	光トラップ	参照白板

*9.の備考を参照

表2　共同試験の結果　　単位 %

試験試料	ヘーズ	室内再現精度標準偏差 (3) (S_{Rw})	室間再現精度標準偏差 (4) (S_R)
PMMA	0.30	0.028	0.051
PMMA-HIimpact-1	0.40	0.027	0.078
PMMA-HIimpact-2	0.95	0.032	0.050
ABS-transparent-1	2.88	0.17	0.30
BS-transparent-2	11.7	0.68	1.25
PMMA-matted	31.0	0.19	1.50
PE	38.2	0.68	1.14
PET/PE	41.8	1.52	2.02

注(3)　室内再現精度，同一の試験室で，同じ材料で同一の試験方法を用い，試験者，試験装置及び試験時間の一部又はすべてが異なる条件下での精度をいう。

(4)　室間再現精度は，室間再現条件での精度を指し，その場合，試験結果は，同一の試験方法と試験材料を用い，異なる試験室，試験者及び試験装置で得られ，室間再現標準偏差として表される。

開口のある装置に比べて，平均値で2.2倍であった。変動係数の平均値は，補償開口がある装置では9.3 %で，補償開口のない装置では13.6 %であった。この結果は補償開口が装置間の効率の差を相殺する働きがあることを示している。

本格的な共同試験（その結果を表2に示す。）では，試験片の作製方法を改良することによって更に均一な試験片が得られるようになり，ばらつきが減少した。

11. 試験報告書 試験報告書には，次の事項を記入する。

a) この規格の番号

b) 試験片の出所及び詳細

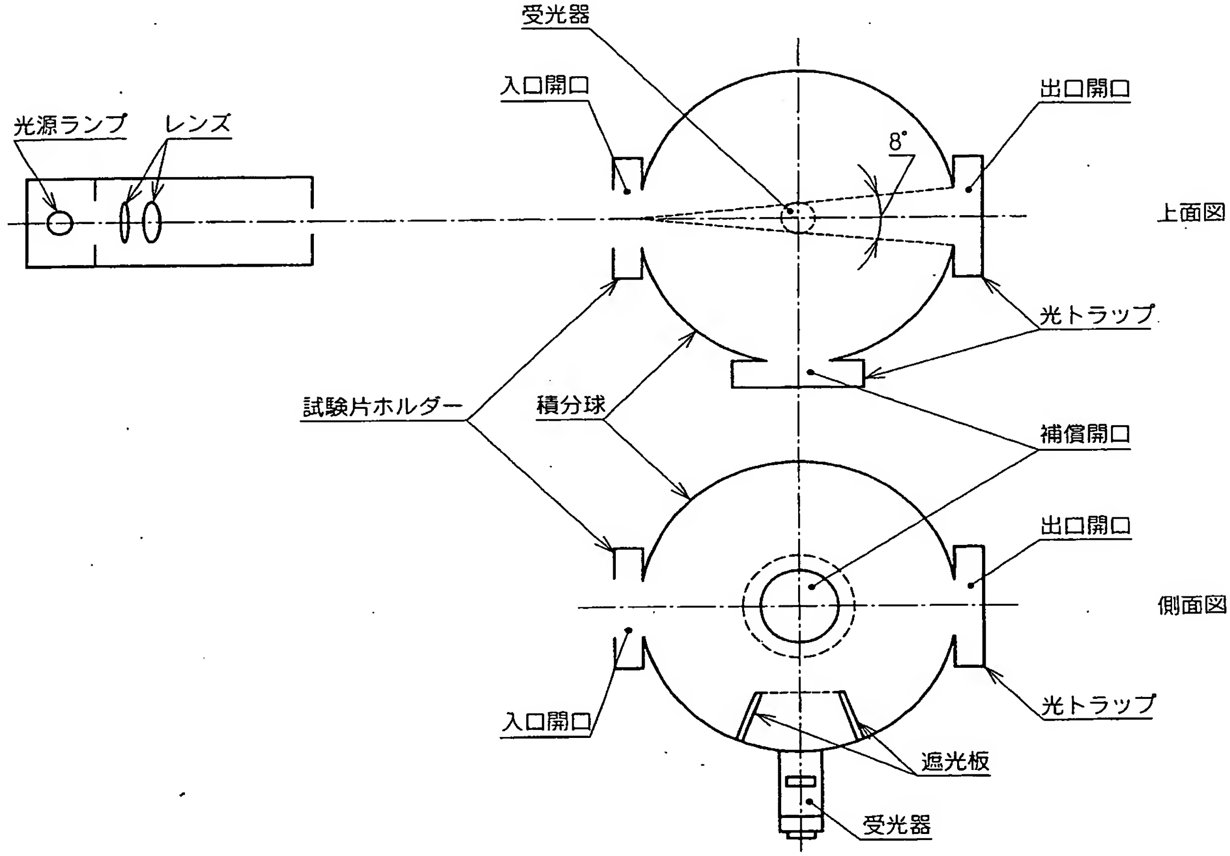
c) 試験片の厚さ（3個の平均値）

d) ヘーズ（3個の平均値）

e) 光源の種類

f) 試験結果に影響したと思われる事柄の詳細

g) 試験日



付図1 装置の構成図

ß

JIS

JAPANESE
INDUSTRIAL
STANDARD

Translated and Published by
Japanese Standards Association

JIS K 7361-1 : 1997

(ISO 13468-1 : 1996)

Plastics—Determination of the total luminous transmittance of transparent materials— Part 1 : Single beam instrument

ICS 83.080.01

Descriptors : plastics, transparency permeability measurement

Reference number : JIS K 7361-1 : 1997 (E)

 6S

Foreword

This translation has been made based on the original Japanese Industrial Standard established by the Minister of International Trade and Industry through deliberations at Japanese Industrial Standards Committee in accordance with the Industrial Standardization Law:

Date of Establishment: 1997-01-20

Date of Public Notice in Official Gazette: 1997-01-20

Investigated by: Japanese Industrial Standards Committee
Divisional Council on High Molecular Materials

JIS K 7361-1 :1997, First English edition published in 1999-08

Translated and published by: Japanese Standards Association
4-1-24, Akasaka, Minato-ku, Tokyo, 107-8440 JAPAN

In the event of any doubts arising as to the contents, the original JIS is to be the final authority.

JIS K 7361-1 : 1997
(ISO 13468-1 : 1996)

Plastics—Determination of the total luminous transmittance of transparent materials— Part 1 : Single beam instrument

Introduction This Japanese Industrial Standard has been prepared on the basis of **ISO 13468-1**, *Plastics—Determination of the total luminous transmittance of transparent materials—Part 1 : Single beam instrument* published in 1996 as the first edition, without modifying its technical content and structure.

The parts underlined with dots are items not included in the original International Standard.

1 Scope This Standard covers the determination of the total luminous transmittance, in the visible region of the spectrum, of planar transparent and substantially colourless plastics, using a single-beam photometer with a specified **CIE** standard light source and photodetector.

This Standard cannot be used for plastics which contain fluorescent materials.

This Standard is basically applicable to transparent moulding materials, films and sheets not exceeding 10 mm in thickness.

Informative references

1 Total luminous transmittance can also be determined by a double-beam spectrophotometer as in part 2 of the Standard. Part 1, however, provides a simple but precise, practical and quick determination. This method is suitable for use not only for analytical purposes but also for quality control.

2 Substantially colourless plastics include those which are faintly tinted.

3 Specimens more than 10 mm thick may be measured provided the instrument can accommodate them, but the results may not be comparable with those obtained using specimens less than 10 mm thick.

2 Normative references The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

ISO 291 : 1977 *Plastics—Standard atmospheres for conditioning and testing*

ISO 5725-1 : 1994 *Accuracy (trueness and precision) of measurement methods and results—Part 1 : General principles and definitions*

ISO 5725-2 : 1994 *Accuracy (trueness and precision) of measurement methods and results—Part 2 : Basic method for the determination of repeatability and reproducibility of a standard measurement method*

ISO 5725-3 : 1994 *Accuracy (trueness and precision) of measurement methods and results—Part 3 : Intermediate measures of the precision of a standard measurement method*

ISO 7724-2 : 1984 *Paints and varnishes—Colorimetry—Part 2 : Colour measurement*

ISO/CIE 10526 : 1991 *CIE standard colorimetric illuminants*

ISO/CIE 10527 : 1991 *CIE standard colorimetric observers*

IEC 50(845) : 1987 *International electrotechnical vocabulary—Chapter 845 : Lighting*

3 Definitions For the purposes of this Standard, the definitions given in **IEC 50(845)** apply, together with the following:

3.1 transparent plastics Plastics in which the transmission of light is essentially regular and which have a high transmittance in the visible region of the spectrum.

Informative reference 4 Provided their geometrical shape is suitable, objects will be seen distinctly through plastic which is transparent in the visible region.

3.2 total luminous transmittance The ratio of the transmitted luminous flux to the incident luminous flux when a parallel beam of light passes through a specimen.

4 Apparatus

4.1 The apparatus shall consist of a stabilized light source, an associated optical system, an integrating sphere fitted with ports, and a photometer. Ingress of external light into the integrating sphere shall be prevented. A schematic arrangement of the apparatus is shown in Fig. 1.

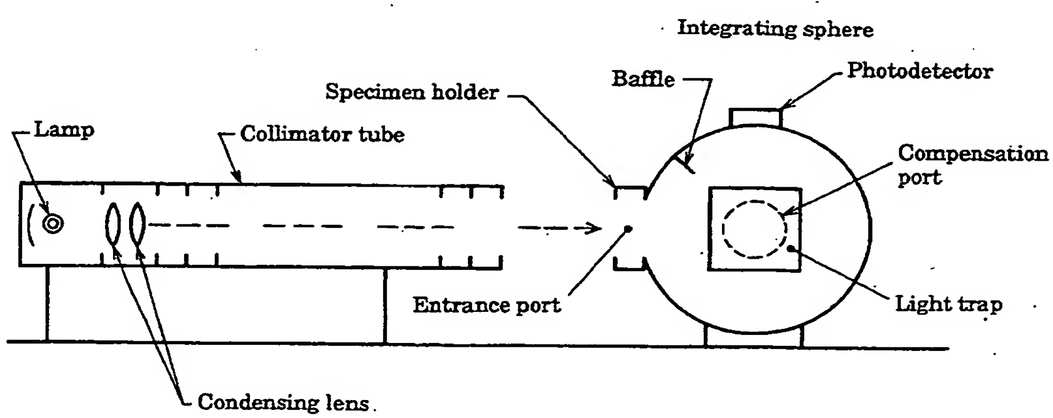


Fig. 1 Schematic arrangement of the apparatus

4.2 The light source and/or photodetector shall be fitted with filters so that the output of the combined system corresponds to the CIE standard colorimetric observer as specified in **ISO/CIE 10527** and **CIE** standard illuminant D_{65} as specified in **ISO/CIE 10526**. The output of the photodetector shall be proportional, to within 1 %, to the incident flux over the flux range used. The spectrophotometric characteristics of the light source and the photodetector shall be kept constant during measurements on specimens. The measurement conditions shall be such that the specimen temperature does not increase while measurements are made.

4.3 The light source shall be combined with an optical system to produce a parallel beam of light; the angle which any ray of this beam makes with the axis of the beam shall not exceed 0.087 rad (5°). The beam shall not be vignetted at either port of the sphere.

The diameter of the beam shall be 0.5 times to 0.8 times the diameter of the entrance port of the integrating sphere.

4.4 Using this instrument, the repeatability standard deviation shall be 0.2 % or less. The within-laboratory reproducibility over long time intervals shall not exceed the repeatability by a factor of more than 3.

4.5 The design of the instrument shall be such that it reads zero when the incident flux is zero.

4.6 The integrating sphere used to collect the transmitted flux may be of any diameter as long as the total port area does not exceed 3 % of the internal area of the sphere.

Information references 5 It is recommended that the diameter of the integrating sphere is not less than 150 mm so that specimens of a reasonable size can be used.

6 When the diameter of the integrating sphere is 150 mm and the diameters of the entrance, compensation and photodetector ports are 30 mm, the ratio of the total port area to the internal area of the sphere is 3.0 %.

4.7 The entrance and compensation ports of the integrating sphere shall be circular and of the same size. The entrance port, compensation port and phtotodetector port shall not lie on a great circle of the sphere.

4.8 The photodetector shall be fitted with baffles to prevent light falling on it directly from the specimen.

4.9 The surfaces of the interior of the integrating sphere and the baffles shall be of substantially equal luminous reflectance which, determined in accordance with **ISO 7724-2**, shall be 90 % or more and shall not vary by more than ± 3 %. When direct measurement of the reflectance of the internal surface of an integrating sphere is difficult, the measurement may be carried out instead on a surface prepared from the same material in the same way as the internal surface.

4.10 The light trap shall absorb 95 % or more of the light incident on it.

4.11 The specimen holder shall be such as to hold the specimen rigidly in a plane normal ± 2° to the light beam and as closely as possible to the integrating sphere to ensure that all the light which passes through the specimen, including scattered light, is collected. The holder shall be designed so that it keeps flexible specimens, such as film, flat.

Informative reference 7 It is recommended that thin, flexible film is clamped round the edge in a double-ring-type holder or double-sided adhesive tape is used to stick it to the edge of the holder. The latter method is used for thicker specimens, which cannot be mounted in the double-ring-type holder.

5 Test specimens

5.1 Specimens shall be cut from film, sheet or injection-moulded or compression-moulded mouldings.

5.2 Specimens shall be free of defects, dust, grease, adhesive from protecting materials, scratches and blemishes, and shall be free from visibly distinct internal voids and particles.

5.3 Specimens shall be large enough to cover the entrance port and the compensation port of the integrating sphere.

Informative reference 8 For a 150 mm diameter sphere, a disc of 50 mm or 60 mm in diameter or a square with a side of the same length is recommended.

5.4 Three specimens shall be taken from each sample of a given material unless otherwise specified.

6 Conditioning

6.1 Prior to the test, condition the specimens in accordance with **ISO 291**, at (23 ± 2) °C and (50 ± 5) % relative humidity, for a length of time dependent on the specimen thickness and material such that the specimens reach thermal equilibrium.

Informative reference 9 16 h is usually sufficient for specimens less than 0.025 mm thick. For thicker material, more than 40 h is recommended.

6.2 Set up the test apparatus in an atmosphere maintained at (23 ± 2) °C and (50 ± 5) % relative humidity.

7 Procedure

7.1 Allow the apparatus sufficient time to reach thermal equilibrium before making any measurements.

7.2 Make the two readings described in Table 1.

Table 1

Reading	Specimen		Light trap over compensation port	Quantity measured
	Entrance port	Compensation port		
τ_1	No	Yes	Yes	Incident light
τ_2	Yes	No	Yes	Total light transmitted by specimen

The specimen shall be mounted directly on the integrating sphere. The compensation port shall be covered with a light trap.

Adjust the photometer so that the reading τ_1 is 100.

7.3 Repeat the readings τ_1 and τ_2, making additional readings with the specimen in positions selected to determine uniformity.

7.4 Measure the thickness of the specimen in three places to an accuracy of 0.02 mm for sheet and 1 μm for film.

8 Expression of results Calculate the total luminous transmittance τ_t % using the following equation:

$$\tau_t\,(\%) = \frac{\tau_2}{\tau_1} \times 100$$

Informative reference 10 Annex A discusses in mathematical terms the effect of the compensation port on the efficiency of the integrating sphere.

Remarks : The efficiency of the integrating sphere is not taken into account in the test method of subclause **5.5** of **JIS K 7105** : 1981 *Testing methods for optical properties of plastics*.

9 Precision (informative) The precision data were determined from an interlaboratory trial organized and analysed in accordance with **ISO 5725-1**, **ISO 5725-2** and **ISO 5725-3** (The content of those standards is equivalent to that of **JIS Z 8402**, *General rules for permissible tolerance of chemical analyses and physical tests*.) in 1993 involving 8 laboratories and 10 samples (see Table 2). No outliers were detected by Grubb's test.

Table 2

Transparent plastics			Reproducibility-within-laboratory standard deviation, s_{RW}	Reproducibility standard deviation, s_R
Samples	Nominal thickness	Total luminous transmittance τ_t %	%	%
PMMA	2 mm	92.6	0.05	0.11
PMMA-I	2 mm	92.3	0.06	0.13
PVC	2 mm	87.0	0.04	0.17
PS	2 mm	89.6	0.06	0.15
MABS	2 mm	89.8	0.05	0.10
PC	3 mm	88.3	0.04	0.23
PP	50 μm	92.4	0.06	0.23
PP (SiO_2)	50 μm	92.1	0.04	0.24
PE-HD	30 μm	90.7	0.04	0.23
PVDC	10 μm	90.3	0.08	0.22

Reproducibility: Precision under conditions in which test results are obtained with the same method on identical test material in different laboratories with different operators using different equipment, and expressed in terms of a reproducibility standard deviation or a reproducibility deviation.

Reproducibility within laboratory: Precision under conditions in which test results are obtained with the same method on identical material in the same laboratory, and with any operator, equipment and/or time of measurement.

Informative reference 11 Of the transparent plastics measured in the laboratory trial, the total luminous transmittance obtained for PMMA was the same as the theoretical value and the reproducibility standard deviation was satisfactory.

These results demonstrated that clear-cast PMMA sheet may be used as a reference material for calibration of the apparatus (see Informative reference in Annex A).

10 Test report The test report shall include the following information:

a) all details necessary for identification of the test specimens and the source of the specimens;

b) the type of light source used;

c) the thickness of the specimens (the average of the three measurements);

d) the total luminous transmittance τ_t (the average of the three calculated results to the nearest 0.1 %).

Annex A (informative)
Use of a compensation port to increase the efficiency of an integrating sphere

The efficiency of an integrating sphere depends on the area of the internal surface, the number of ports and the way they are covered.

An error, due to the inefficiency of an integrating sphere when transmittance is measured by a single-beam instrument with an entrance port, is inevitable.

A compensation port can be introduced, however, to avoid this error, making it unnecessary to calibrate the instrument with a reference standard.

The total luminous transmittance is calculated as follows (see also Fig. A.1):

When a specimen is positioned over the compensation port to modify the incident-flux reading, the luminous flux in the integrating sphere ϕ_1, which includes the flux reflected back into the sphere by the specimen $\phi \times \rho'$, is given by the equation.

$$\phi_1 = \phi - (\phi_e + \phi_c \times \alpha' + \phi_c \times \tau') \quad \text{(A.1)}$$

where,
- ϕ : the total incident luminous flux
- ϕ_e : the flux emerging from the entrance port
- ϕ_c : the flux emerging from the compensation port
- τ' : the transmittance of the specimen (% transmittance; $\tau = \tau' \times 100$)
- ρ' : the reflectance of the specimen
- α' : the absorptance of the specimen

Since $\tau' + \rho' + \alpha' = 1$ and assuming $\phi_e \approx \phi_c$

$$\phi_1 = \phi - 2\phi_e + \phi_e \times \rho' \quad \text{(A.2)}$$

When a specimen is placed over the entrance port, the luminous flux in the sphere ϕ_2 is given by the equation

$$\begin{aligned} \phi_2 &= \phi - \left[(\phi \times \rho' + \phi \times \alpha') + (\phi_e \times \tau' \times \alpha' + \phi_e \times \tau'^2) + \phi_c \times \tau'\right] \\ &= \tau' \times (\phi - 2\phi_e + \phi_e \times \rho') \quad \text{(A.3)} \end{aligned}$$

From equations (A.2) and (A.3)

$$\tau' = \frac{\phi_2}{\phi_1} = \frac{\tau}{100}$$

Since the terms common to equations (A.2) and (A.3) cancel out, the efficiency of the integrating sphere has no influence on the luminous transmittance.

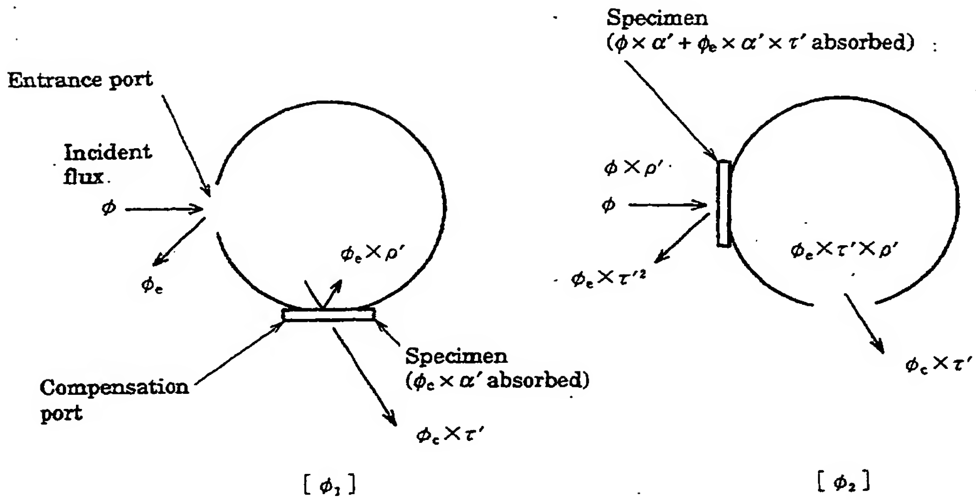


Fig. A.1 Determination of ϕ_1 and ϕ_2 for the integrating sphere

Informative reference : τ_t can be determined using an integrating sphere with no compensation port or using an integrating sphere with a compensation port over which a reflectance standard is placed. Since, however, spuriously high readings may be obtained due to the inefficiency of the integrating sphere used, it is necessary to use a standard calibrated using a double-beam spectrophotometer or using the procedure specified in **ISO 13468-1** unless it is proved that the efficiency of the sphere has little effect.

A well prepared clear-cast PMMA sheet 3 mm thick usually gives a theoretical maximum value of 92.6 % of total luminous transmittance.

Errata for JIS (English edition) are printed in *Standardization Journal*, published monthly by the Japanese Standards Association, and also provided to subscribers of JIS (English edition) in *Monthly Information*.

Errata will be provided upon request, please contact:
Standardization Promotion Department, Japanese Standards Association
4-1-24, Akasaka, Minato-ku, Tokyo, 107-8440 JAPAN
TEL. 03-3583-8002 FAX. 03-3583-0462

C

Japanese Industrial Standards

From Wikipedia, the free encyclopedia

This article is about Japanese Industrial Standards in general; see JIS encoding for the character encoding used in representing the Japanese language for computer software and communication.

Japanese Industrial Standards (**JIS**) specifies the standards used for industrial activities in Japan. The standardization process is coordinated by Japanese Industrial Standards Committee and published through Japanese Standards Association.

JIS symbol (used since October 1, 2005 and all changed to this renewed JIS symbol from October 1, 2008).

Contents

History

JIS old symbol (allowed to use until end of September 30, 2008).

In the Meiji era, private enterprises were responsible for making standards. However, the Japanese government did have standards and specification documents for procurement purposes for certain articles, such as munitions.

These were summarized to form an official standard (old JES) in 1921. During World War II, simplified standards were established to increase matériel output.

The present Japanese Standards Association was established after Japan's defeat in World War II in 1945. The Japanese Industrial Standards Committee regulations were promulgated in 1946, Japanese standards (new JES) was formed.

The Industrial Standardization Law was enacted in 1949, which forms the the legal foundation for the present Japanese Industrial Standards (JIS).

The Industrial Standardization Law was revised in 2004 and the "JIS mark" (product certification system) was changed, and the new JIS mark was applied since October 1, 2005 upon re-certification. The old mark is allowed to be used until September 30, 2008, for a transition period of 3 years, and every manufacture obtaining new or renewing certification under the authority's approval are then able to use the new JIS mark. Therefore all JIS certified Japanese products shall have the new JIS mark after October 1, 2008.

Standards classification and numbering

Standards are named like "JIS X 0208:1997", where X denotes area division, followed by four digits (or five digits for some of the standards corresponding ISO standards), and the revision release year. Divisions of JIS and significant standards are:

- A - Civil Engineering and Architecture
- B - Mechanical Engineering
    - JIS B 7021-1989 : Classification and Water Resistibility of Water Resistant Watches for General Use
    - JIS B 7512-1993 : Steel tape measures
    - JIS B 7516-1987 : Metal Rules
- C - Electronic and Electrical Engineering
    - JIS C 0920:2003 : Degrees of protection provided by enclosures (IP Code)
- D - Automotive Engineering
- E - Railway Engineering
- F - Shipbuilding
- G - Ferrous Materials and Metallurgy
- H - Nonferrous materials and metallurgy[1]
    - H2105 - Pig lead
    - H2107 - Zinc ingots
    - H2113 - Cadmium metal
    - H2116 - Tungsten powder and tungsten carbide powder
    - H2118 - Aluminum alloy ingots for die castings
    - H2121 - Electrolytic cathode copper
    - H2141 - Silver bullion
    - H2201 - Zinc alloy ingots for die casting
    - H2202 - Copper alloy ingots for castings
    - H2211 - Aluminium alloy ingots for castings
    - H2501 - Phosphor copper metal
    - H3100 - Copper and copper alloy sheets, plates and strips
    - H3110 - Phosphor bronze and nickel silver sheets, plates and strips
    - H3130 - Copper beryllium alloy, copper titanium alloy, phosphor bronze, copper-nickel-tin alloy and nickel silver sheets, plates and strips for springs
    - H3140 - Copper bus bars
    - H3250 - Copper and copper alloy rods and bars
    - H3260 - Copper and copper alloy wires
    - H3270 - Copper beryllium alloy, phosphor bronze and nickel silver rods, bars and wires
    - H3300 - Copper and copper alloy seamless pipes and tubes
    - H3320 - Copper and copper alloy welded pipes and tubes
    - H3330 - Plastic covered copper tubes
    - H3401 - Pipe fittings of copper and copper alloys
    - H4000 - Aluminium and aluminium alloy sheets and plates, strips and coiled sheets
    - H4001 - Painted aluminium and aluminium alloy sheets and strips
    - H4040 - Aluminium and aluminium alloy rods, bars and wires
    - H4080 - Aluminium and aluminium alloys extruded tubes and cold-drawn tubes
    - H4090 - Aluminium and aluminium alloy welded pipes and tubes
    - H4100 - Aluminium and aluminium alloy extruded shape
    - H4160 - Aluminium and aluminium alloy foils

- H4170 - High purity aluminium foils
- H4301 - Lead and lead alloy sheets and plates
- H4303 - DM lead sheets and plates
- H4311 - Lead and lead alloy tubes for common industries
- H4461 - Tungsten wires for lighting and electronic equipments
- H4463 - Thoriated tungsten wires and rods for lighting and electronic equipment
- H4631 - Titanium and titanium alloy tubes for heat exchangers
- H4635 - Titanium and titanium alloy welded pipes
- H5401 - White metal
- H8300 - Thermal spraying—zinc, aluminium and their alloys
- H8601 - Anodic oxide coatings on aluminium and aluminium alloys
- H8602 - Combined coatings of anodic oxide and organic coatings on aluminium and aluminium alloys
- H8615 - Electroplated coatings of chromium for engineering purposes
- H8641 - Zinc hot dip galvanizings
- H8642 - Hot dip aluminized coatings on ferrous products

- K - Chemical Engineering
- L - Textile Engineering
- M - Mining
- P - Pulp and Paper
  - JIS P 0138-61 (JIS P 0138:1998): process finished paper size (ISO 216 with a slightly larger B series)
- Q - Management System
- R - Ceramics
- S - Domestic Wares
- T - Medical Equipment and Safety Appliances
- W - Aircraft and Aviation
- X - Information Processing
  - JIS X 0201:1997 : Japanese national variant of ISO 646
  - JIS X 0202:1998 : Japanese national standard which corresponds to ISO 2022
  - JIS X 0208:1997 : 7-bit and 8-bit double byte coded KANJI sets for information interchange
  - JIS X 0212:1990 : Code of the supplementary Japanese graphic character set for information interchange
  - JIS X 0213:2004 : 7-bit and 8-bit double byte coded extended Kanji sets for information interchange
  - JIS X 0221-1:2001 : Japanese national standard which corresponds to ISO 10646
  - JIS X 0401:1973 : To-do-fu-ken (prefecture) identification code
  - JIS X 0402:2003 : Identification code for cities, towns and villages
  - JIS X 0405:1994 : Commodity classification code
  - JIS X 0408:2004 : Identification code for universities and colleges
  - JIS X 0501:1985 : Bar code symbol for uniform commodity code
  - JIS X 0510:2004 : QR Code
  - JIS X 3001-1:1998, JIS X 3001-2:2002, JIS X 3001-3 : Fortran programming language
  - JIS X 3002:1992 : COBOL
  - JIS X 3005-1:2002 : SQL
  - JIS X 3010:2003 : C programming language
  - JIS X 3014:2003 : C++
  - JIS X 3030:1994 : POSIX
  - JIS X 4061:1996 : Collation of Japanese character string
  - JIS X 6002:1980 : Keyboard layout for information processing using the JIS 7 bit coded

character set
  - JIS X 6054-1:1999 : MIDI
  - JIS X 6241:1997 : 120 mm DVD -- Read-only disk
  - JIS X 6243:1998 : 120 mm DVD Rewritable Disk (DVD-RAM)
  - JIS X 6245:1999 : 80 mm (1.23GB/side) and 120 mm (3.95GB/side) DVD-Recordable-Disk (DVD-R)
  - JIS X 9051:1984 : 16-dots matrix character patterns for display devices
  - JIS X 9052:1983 : 24-dots matrix character patterns for dot printers
- Z - Miscellaneous

References

1. ^ *List of JIS that is possible to certificat by JQA (http://64.233.167.104/search?q=cache:jQZynb38L54J:www.jqa.jp/english/jis_a/file/e_kikaku_h070416.pdf+JIS+H2201&hl=en&ct=clnk&cd=11&gl=us&client=firefox-a)*, <http://64.233.167.104/search?q=cache:jQZynb38L54J:www.jqa.jp/english/jis_a/file/e_kikaku_h070416.pdf+JIS+H2201&hl=en&ct=clnk&cd=11&gl=us&client=firefox-a>. Retrieved on 9 March 2008

See also

- ISO
- IEC
- Japanese Agricultural Standards
- Japanese typographic symbols gives the Unicode symbol for the Japanese industrial standard.

External links

- Japanese Industrial Standards Committee (http://www.jisc.go.jp/eng/index.html)
- Japanese Standards Association (http://www.jsa.or.jp/default_english.asp)
- Details on the history of JIS (in Japanese) (http://www.horagai.com/www/moji/nihon/hosetu1.htm)

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1	7,385,017	Silicone resin compositions and molded articles thereof
2	7,381,776	Crosslinked rubber moldings for golf balls and method of manufacture
3	7,381,756	Ink set, ink jet recording method, recording material set, recording medium and recording matter
4	7,378,374	Thermally sensitive recording medium
5	7,377,292	Vehicular brake system component
6	7,374,527	Rubber roller for image-forming apparatus
7	7,371,786	Coating composition, coating formed therefrom, anti-reflection coating, anti-reflection film, and image display device
8	7,371,701	Nonwoven fabric of polyester composite fiber
9	7,369,807	Cleaner, and process cartridge and image forming apparatus using the cleaner
10	7,368,498	Polypropylene resin composition and injection-molded article made of the same
11	7,367,902	Golf ball
12	7,367,901	Multi-piece solid golf ball
13	7,367,554	Member for preventing feeding of a plurality of sheets at a time
14	7,367,518	Descaling nozzle
15	7,365,900	Electrophoretic sheet, electrophoretic device, method for manufacturing electrophoretic device, and electronic apparatus
16	7,365,122	Fluoroelastomer composition
17	7,364,607	Wrought fiber sheet and filter unit
18	7,357,962	Automobile body-used light-colored water based coating composition

19 7,357,732 T Solid golf ball
20 7,356,280 T Electrophotographic photoreceptor and method of recycling the electrophotographic photoreceptor
21 7,351,766 T Thermoplastic resin composition and engineering plastic composition
22 7,351,492 T Solid oxide type fuel cell-use electrode support substrate and production method therefor
23 7,347,847 T Disposable diaper capable of being put on either from the front or the back of a wearer
24 7,347,239 T Tire noise reducing system
25 7,345,819 T Light diffusing member
26 7,344,454 T Three-piece solid golf ball
27 7,344,237 T Recording liquid, liquid cartridge, liquid ejection cartridge, liquid ejection apparatus, and liquid ejection method
28 7,342,720 T Surface protective member for transmission screen
29 7,341,635 T Eraser
30 7,340,200 T Charging unit and image forming apparatus incorporating the unit
31 7,339,733 T Fresnel lens sheet and rear projection screen using it
32 7,339,019 T Ethylene-.alpha.-olefin copolymer
33 7,338,984 T Resin composition containing ultrafine inorganic particle
34 RE40,118 T Multi-piece solid golf ball
35 7,335,715 T Ethylene-alpha-olefin copolymer
36 7,335,420 T Feed/transport roller
37 7,335,115 T Multi-piece solid golf ball
38 7,334,618 T Pneumatic tire with tread having cap layer and spaced apart base layers
39 7,334,383 T Package and method of forming the package
40 7,333,401 T Timepiece dial and timepiece
41 7,329,194 T Multi-piece solid golf ball
42 7,325,543 T Covering material for solar thermal power generating system and solar thermal power generating system formed by spreading the covering material
43 7,324,778 T Fixing device including heating roller and pressure roller
44 7,322,131 T Shoe with slip preventive member
45 7,320,846 T Bipolar battery and method for manufacturing the same
46 7,316,841 T Eraser
47 7,316,623 T Golf club head
48 7,316,473 T Inkjet recording method and inkjet recording apparatus
49 7,316,255 T Pneumatic tire and method of manufacturing the same
50 7,316,097 T Glass run channel for vehicle and glass run channel assembly for vehicle

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